by John A. Tesk

NIST Reference Material for UHMWPE

Reference Material (RM) 8456, Ultra High Molecular Weight Polyethylene (UHMWPE) is now available from The National Institute of Standards and Technology. RM 8456 is intended primarily for use in mechanical characterization of material properties and lab-simulated performance. This material is not intended for use in human implantation or any human biomedical device.

RM 8456 is available in units consisting of one cylindrical bar each with nominal dimensions of 7.62 cm (3 in) in diameter by 152.4 cm (60 in) in length. Reference properties are given in a report of investigation that will accompany each unit. The properties reported are the Tensile: Young's Modulus, Yield Strength, Ultimate Strength, and Elongation to Failure. Properties are given as mean values with their expanded uncertainties; they characterize the bar across the center 5.62 cm (2.21 in) of its diameter and down the entire bar length. Samples made from this RM, therefore, should be fabricated from the central 5.62 cm of the 7.62 cm diameter of the bar.

The UHMWPE used for RM 8456 was donated by Poly Hi Solidur, Inc., MediTECH Division (Production Code PG9981, Premium Grade Ultra High Molecular Weight Polyethylene, Virgin UHMWPE Raw Material Lot No. 332945, source identified as TICONA GUR 1050[##]).

The overall direction and coordination of the analyses were under John A. Tesk of the NIST Polymers Division. Dr. Stephen Li of the Hospital for Special Surgery provided valuable consultation (It was through Dr. Li's efforts that the first supply of UHMWPE reference material had been made available to researchers. That initial supply has been exhausted and RM 8456 was developed with the objective of having NIST serve as a source for a new UHMWPE RM).

The support aspects involved in the preparation and issuance of this Reference Material were coordinated through the Standard Reference Materials Program by Joylene W. Thomas.

For purchasing information contact: Miss Joylene W. Thomas, SRM Coordinator, NIST Standard Reference Materials Program, (301) 975-5542, Email: joylene.thomas@nist.gov

For technical information contact: Dr. John A. Tesk, Coordinator, Biomaterials Standards and Reference Materials, NIST Polymers Division, (301) 975-6799, Email: john.tesk@nist.gov

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